

Polymide Aerogel as Wire Insulation

Completed Technology Project (2015 - 2018)



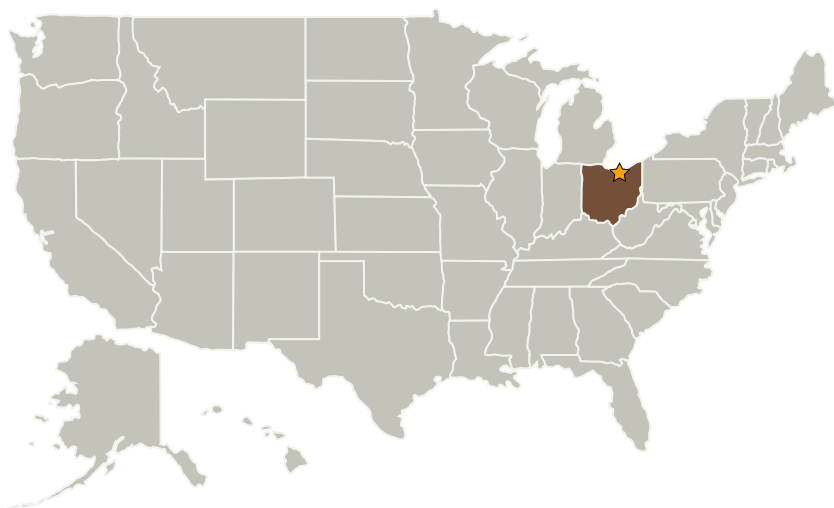
Project Introduction

Evaluate at least five polyimide aerogel formulations for coating cables and down select for optimization study.

Anticipated Benefits

NASA Funded: Wires with aerogel insulation can provide significant mass savings for aircraft and spacecraft. NASA Unfunded: Wires with aerogel insulation can provide significant mass savings for aircraft and spacecraft. Commercial: Wires with aerogel insulation can provide significant mass savings for aircraft and spacecraft.

Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|-------------------------------|-------------------|-------------|-----------------|
| ★ Glenn Research Center (GRC) | Lead Organization | NASA Center | Cleveland, Ohio |

Primary U.S. Work Locations

Ohio



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Game Changing Development

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Project Transitions

**October 2015:** Project Start**January 2018:** Closed out

Closeout Summary: Demonstrated the ability to coat 15 m of carbon nanotube wire in a continuous process (could have coated much longer wire but stopped the process). Increased the technology from TRL2 to TRL3. The objective of this project was to develop and mature high payoff nanotechnologies for future NASA mission with a focus on technologies that could lead to significant reductions in vehicle weight and improvements in performance. The project successfully developed high strength carbon nanotube composites and, for the first time, demonstrated them in a load-bearing component (composite overwrap pressure vessel) that was flight tested on a sounding rocket as part of a cold-gas thruster system. The project also developed polyimide aerogel insulation for electrical wiring that is 90% lighter than conventional polymer insulation and carbon nanotube and metal nanolattice cores for composite sandwich structures with properties that exceeded those of conventional aluminum honeycomb cores at the same density.

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Mary J Werkheiser

Program Manager:

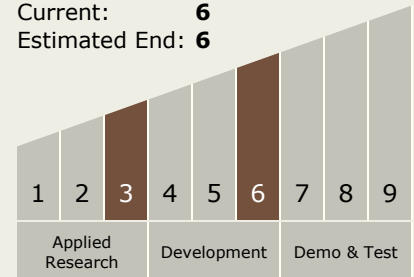
Gary F Meyering

Principal Investigator:

Azlin Biaggi-labiosa

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Target Destination

Foundational Knowledge